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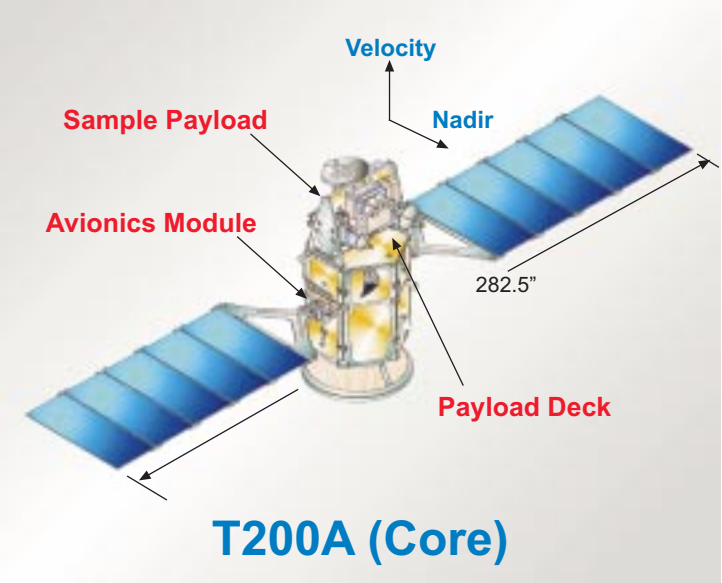
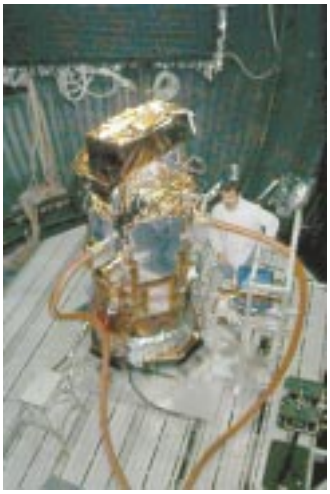
Rapid Spacecraft Development Office

T200A Spacecraft



T200A (Core)



T200A in Thermal Vacuum Chamber

T200A Fairing Integration

The T200A offers flexibility to the Rapid II users for cost-efficient, mission-unique modifications. It is capable of flying in low earth orbit, any altitude, any inclination, and eccentricity in the range of 400 to 1,000 km. The T200A is fully redundant with the reliability calculated to be 0.94 at 3 years based on heritage and flight experience reliability models. An option for this spacecraft includes a stellar-based, high-precision attitude control system (ACS) and increased data storage capability. The payload mounting deck is highly flexible for the accommodation of a variety of instruments and payloads.

Key System Features

- Build to print version of ROCSAT spacecraft
- All components available and flight qualified
- Modular design
  - Allows easy adaptation and growth
  - Allows for parallel AI&T tasks
- Compatible with Athena-1/2, Taurus, Delta LVs
- Propellant capacity: 73 kg, monopropellant
- Earth-oriented, three-axis, pitch momentum bias
- Simple aluminum structure
- Battery clamped power system with silicon solar array
- Monoprop blowdown propulsion system, eight 1-lbf thrusters
- 80186 650 KIPs OBC with GPS interface
- GSTDN compatible S-band transponder with CCSDS formatting

Payload Accommodations

- Performance calculated for reference orbit of 600 km and 35 deg inclination
- Payload mass = 75 kg, Payload power = 72 watts
- Attitude control
  - Accuracy: 0.3° P/R, 0.4° Y
  - Knowledge: 0.1° P/R and 0.09° Y
  - Jitter: <0.005° above 3 Hz per axis
  - Stability: <0.1° /min per axis
- Offers MIL-STD-1553B, RS-232, and RS-422 payload interfaces
- Power: Fused, relayed, unregulated 28 +/-6 Vdc
- Data storage: 4 Gbits BOL, 2 Gbits EOL
- 50% of 650 KIPS OBC throughput available
- 48% of 512 KB OBC RAM available
- Downlink rate: 1.4 Mbps
- Provides UTC time to payload to within 0.1 msec

T200A Key Subsystem Characteristics

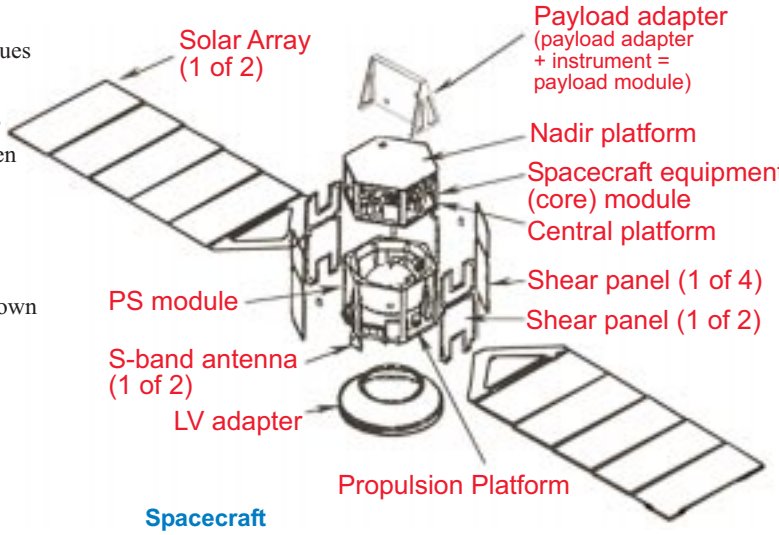
Thermal Control
- Flight-proven passive techniques
- Dedicated radiator for battery

Structure and Mechanisms
- All aluminum structure, proven design
- Flat folding solar arrays with tape rule hinges

Propulsion
- Monoprop, hydrazine blow-down system
- Thrusters location minimizes contamination effects
- 73 kg propellant tank

Electrical Power
- Silicon solar array
- 22-cell, 21 amp hour battery

Payload Adapter
- All aluminum structure
- Provides unobstructed FOVs



Spacecraft
Modular design allows easy separation for parallel integration of the payload, core, and propulsion modules. Core module and MGSE design allows ready access to each component.

Attitude Control
- Scan wheels for earth attitude reference and momentum management
- Reaction wheels for momentum management
- Coarse and fine sun sensors
- Mag torquers unload momentum
- Gyro propagated attitude estimate
- Biaxial solar array drives

Comm & Data Handling
- Flight-proven RF
- Redundant GPS
- 4/2 BOL/EOL SSR
- Redundant 80186 OBCs
- MIL-STD-1553 Data Bus
- CCDS telemetry format

Program Schedule	Year 1												Year 2												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Program Milestones	ATP		MDR									IIRR		PER			Deliver to Launch Site			Launch		Accept On-Orbit			

T200A Mass and Power

Subsystem	Mass, kg	Avg. Load W
Structure	60.7	0.0
Thermal	4.7	2.7
Propulsion	17.5	13.0
EPS with losses and harness	82.0	190.3
ACS	44.4	76.9
DMS	22.1	57.1
TT&C	11.0	16.0
LV Adpater	18.4	N/A
Total SC	**260.8**	**356.0**
Propellant *	73.0	N/A
Payload	75.0	94.0
Launch Total	**408.8**	**450.0**

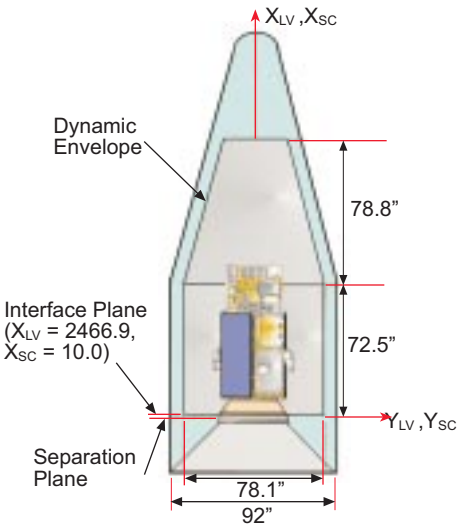
** Raises orbit within 30 days of launch*
All values include contingency

T200A Performance

	Units	Capability
Spacecraft Bus Mass	kg	242
Spacecraft Bus Power (includes losses and charging)	W	356
Payload Mass	kg	75 (1)
Payload Power (EOL)	W	94
Battery Size	amp-hr	21
Propellant Mass Capability	kg	73
Downlink Rate	Mbps	1.4
Data Storage (EOL)	Gbits	2
Attitude Knowledge - R/P/Y	arcsec	360/360/324
Attitude Accuracy - R/P/Y	arcsec	1080/1080/1440

(1) This value valid for all compatible launch vehicles

T200A in LV




Successful Launch

TRW

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